technique of using scientific methods to access the various alternatives so that proper decisions can be taken.

With the increased complexities of life, the business has grown tremendously in different operation research which is very helpful in optimizing profit in industrial productions. Operation research is the application of scientific methods, techniques and tools to problems involving the operations of systems so as to provide those in control of operations with optimum solution to the problems. This has dragged our interest to study the extent of benefit in business using this technique.

The work signifies the reasonable use of linear programming method in a manufacturing company, The Agawa Leather Store. The problem inscribed here was to determine the product mix to be adopted by the company for selling leather products at which the optimal profit level would be accomplished. Sometimes manufacturers also face constraints while making products. The aim of our study was to propose linear programming as a decision tool to determine the optimal product mix for maximum profit with available resources.

Linear programming is a technique for determining an optimum schedule of interdependent activities in view of the available resources (Swarup et al., 2014).

Interestingly LP is the favourite tool in the hands of OR professional because it is simple, easy to understand and robust. Here robust means it is perfect for nothing but good enough for everything. Unfortunately no real world problems are really linear. However, most real world problems are close enough to linear problem. It is precisely for this reason and this context that LP is good enough for everything (Chandrasekhar, 2014).

Materials and Methods:

The data for this research work has been collected from the Agawa Leather Store,Patna. The data consist of basic raw materials such as leather, cloth and labour hours consumed available for daily production of two different sizes of bagsand profit contribution per unit size of bags produced.

In manufacturing each unit of bag, information on the quantity of each raw material in stock per day was obtained. Data regarding the profit that the industry gains by selling each purse were obtained as well as labour hours were also noted. On the other hand information regarding raw materials like thread or glue which is used for sewing or pasting the internal section as well as finishing the product were neglected and their effects were ignored in the analysis of the product.

Therefore, the only cost element considered in the production of purses was the cost of two main raw materials and the consumption of labour hours.

Results and Discussion:

The values of various constraints for the production of per unit purse as obtained are shown in the Table 1.

Table 1. Observation obtained regarding Raw materials and Profit Coefficients

Sl. No.	Constraints	Product A	Product B
1.	Leather	6feet^2	3feet^2
2.	Labourhours	5hours	0.8hours
3.	Cloth(90cm wide)	100cm	10cm
4.	Profit	Rs 150	Rs 60

Total available raw materials and labour hours as collected from the data of the industry are shown in Table 2.

Table 2. Observation for availability of restricted resources for product A and B

Sl. No.	Constraints	Limitation
1	leather	$\geq$ 600feet^2
2	Labour hour	$\geq$100 hours
3	cloth	No limitation
4	Marketing constraints for product B	$\geq$ 125

The constructed objective function and constraint function for product A and B are shown below:

Objective function:

$$Z = 150x_1 + 60x_2$$

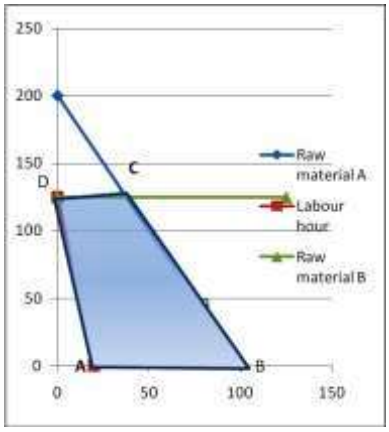
Constraint function:

$$6x_1 + 3x_2 \leq 60000$$

$$5x_1 + 0.8x_2 \geq 100$$

$$X_2 \leq 125$$

All these data were plotted on a linear graph in order to get the feasible region and the optimum basic feasible solution which is in the final result of the research. All these inequalities were converted into equations and plotted on the graph. The area ABCD was the feasible region and the point B was the optimum basic feasible solution. This is shown in fig 1.



It would be advantageous for the industryto produce 100 units of product A to attain maximum profit.

This trend was not exhibited in past by the industry. It was just making production in a random manner. There was no significant proportion for the number of each purse produced. In order to attain the maximum profit level and use their limited resources in the best possible way it should make productions according to the result of the research.

Conclusion :

The application of linear programming methods for optimal resource allocation in a product mix industry has been demonstrated in the work. This is evident from the result obtained for the profit maximization type of the LP model fitted to the data collected on purse manufacturing from a small scale industry in Patna.

The results of the LP model fitted to the data collected from the industry are only based on the amount of two raw materials and the labor hours consumed for the production. But if the marketing elements are implemented into LP formulation and analysis, the results reported here might be different and more appropriate. Nonetheless, results of this work could still serve as a useful guide to the management of the concerned industry in the formulation of production and marketing strategies for its product.

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